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(54) **Abstract Title: Dust receptacle fixing means of a cyclone vacuum cleaner**

(57) Means are disclosed for detachably fixing a dust receptacle (320) to a cyclone vacuum cleaner independently of its cyclone body (310). The dust receptacle (320) and the cyclone body (310) form a cyclone unit (300, Fig 2) which is mounted in a mounting portion (110, Fig 2) of the body (100) of the cleaner. The fixing means comprises a guide member (330), an operation lever (340) and a groove (321) formed having a predetermined depth and extending from the centre of that side of the dust receptacle (320) that faces the bottom side of the mounting portion (110, Fig 2). The guide member (330) is disposed in the groove (321) for guiding attachment and detachment of the dust receptacle (320). The operation lever (340) is provided with a cam (341) having an eccentrically-positioned cam projection (341a) for insertion into a cam follower (331) associated with the guide member (330). As the operation lever (340) is rotated and counter-rotated, the guide member (330) is moved upwards and downwards over a distance predetermined by the eccentricity of the cam projection (341a).

FIG. 3

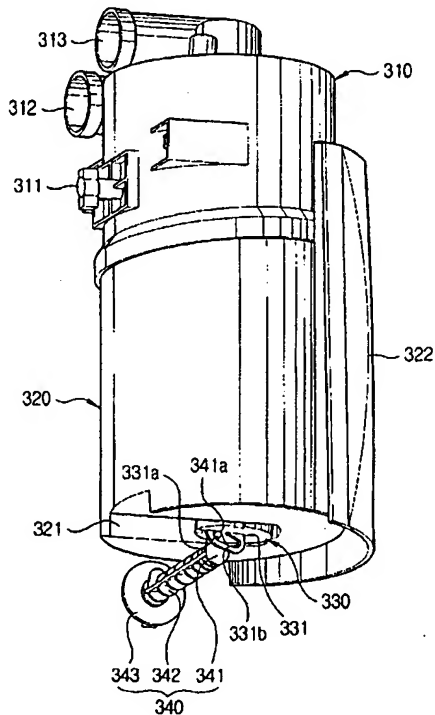


FIG. 1

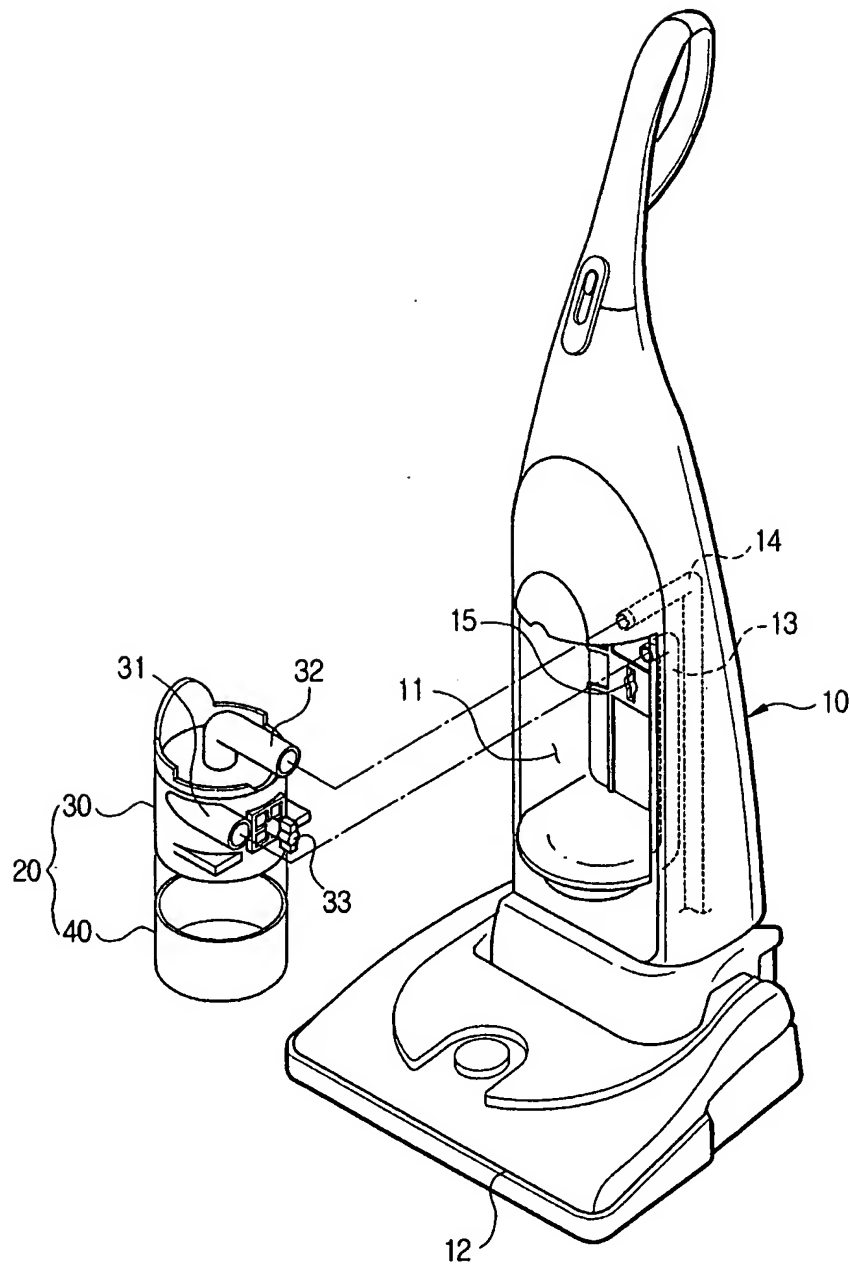
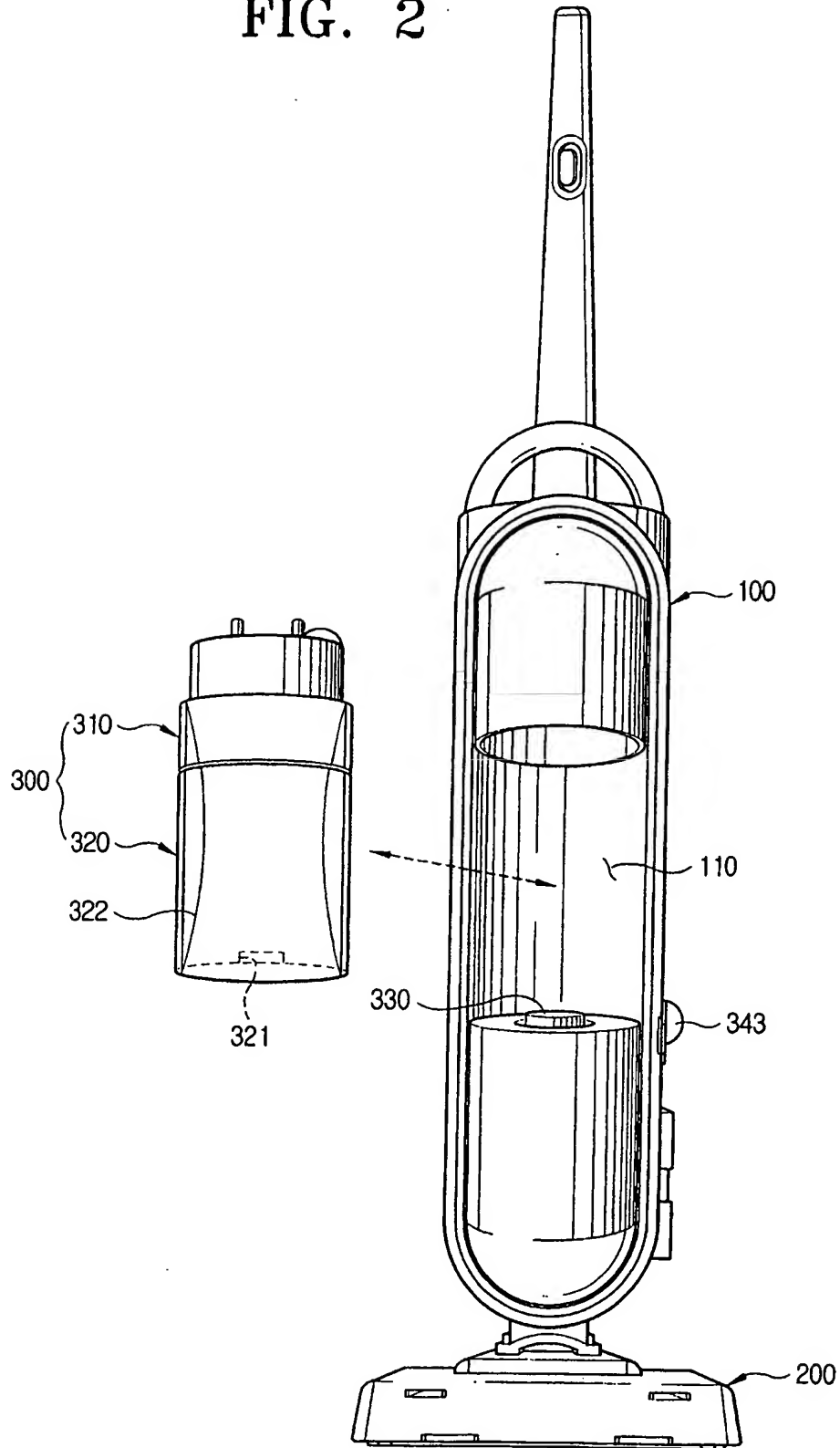


FIG. 2



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FIG. 3

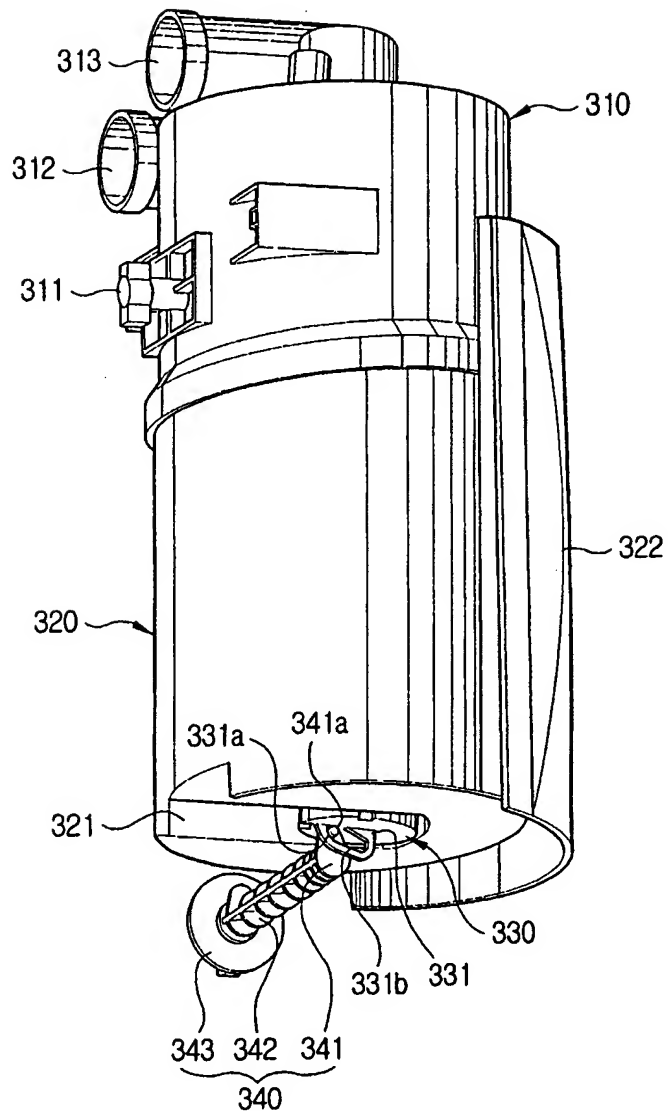


FIG. 4A

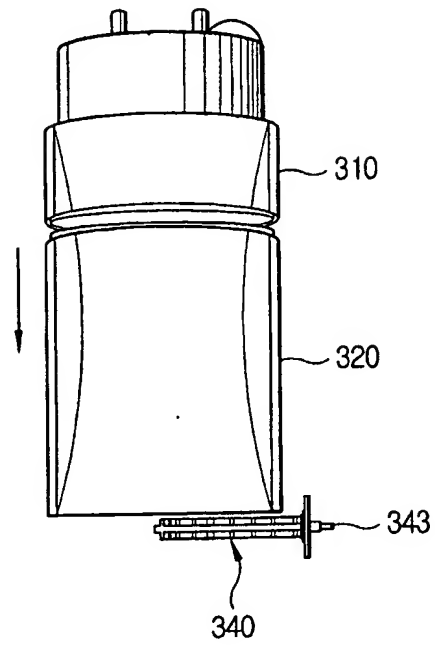
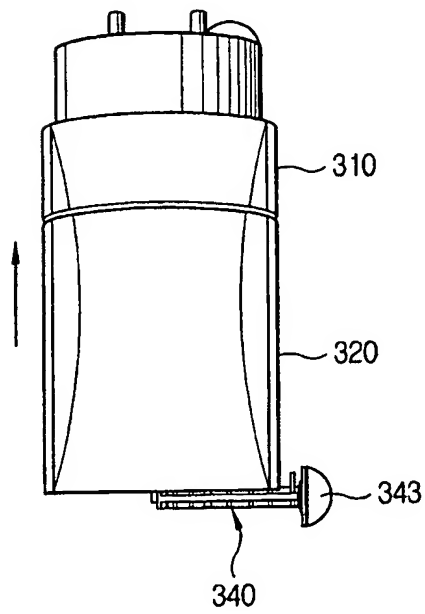


FIG. 4B



Cyclone Vacuum Cleaner

This invention relates to a vacuum cleaner, and in particular to means for detachably fixing a dust receptacle to a cyclone vacuum cleaner.

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As shown Figure 1, a conventional cyclone vacuum cleaner comprises a cleaner body 10, and a cyclone unit 20 removably mounted in a mounting portion 11 of the cleaner body 10. The cyclone unit 20 is provided for separating contaminants from contaminant-laden air by a centrifugal force that is provided by a whirling stream of
10 drawn-in air. A vacuum generating device (not shown) is provided in the cleaner body 10, and a nozzle unit 12 is provided at a lower portion of the cleaner body. The cyclone unit 20 has a cyclone body 30, and a dust receptacle 40 which is removably mounted on the cyclone body.

15 The cyclone body 30 has an inflow passage 31 on an upper side, the inflow passage being in fluid communication with the nozzle unit 12. Accordingly, contaminants drawn in from a surface to be cleaned by action of the nozzle unit 12, flow into the cyclone body 30 via the inflow passage 31. The inflow passage 31 is formed in such a manner that the air is drawn into the cyclone body 30 through the inflow passage in a
20 tangential direction. Accordingly, the air drawn in through the inflow passage 31 is formed into a whirling current rotating along the inner wall of the cyclone body 30.

The cyclone body 30 also has an outflow passage 32 positioned at the centre of its upper side, the outflow passage being in fluid communication with the vacuum
25 generating device 30. When the contaminants are removed from the air, the clean air is discharged from the cleaner body 10 through the outflow passage 32 and the vacuum generating device. The contaminants removed from the air in the cyclone body 30 are collected in the dust receptacle 40.

30 First and second tubes 13, 14 are positioned such that one end of each tube faces forwards, the other end of the first tube 13 being connected to the vacuum generating

device, and the other end of the second tube 14 being connected to the nozzle unit 12. The inflow passage 31 and the outflow passage 32 face backwards in parallel to complement the first and second tubes 13, 14. Accordingly, simply by inserting the cyclone body 30 horizontally into the mounting portion 11, the inflow passage 31 and the outflow passage 32 are connected with the pair of the tubes 13, 14 respectively.

A locking handle 33 is pivotably disposed on the outside of the rear portion of the cyclone body 30, and a handle-coupling portion 15 is formed on the cleaner body 10 to complement the locking handle 30. Accordingly, the cyclone body 30 can be securely mounted in the cleaner body 10 by inserting the locking handle 33 through the handle-coupling portion 15, and turning the locking handle through 90°.

However, an operator of this conventional cyclone vacuum cleaner experiences an inconvenience when emptying the contaminants in the dust receptacle 40. This is because the operator has to separate the entire cyclone unit 20 from the mounting portion 11 of the cleaner body 10, and then separate the dust receptacle 40 from the cyclone body 30. In other words, this conventional cyclone vacuum cleaner has a structure which does not allow separation of the dust receptacle 40 by itself from the mounting portion 11 of the cleaner body 10. As a result, the removal of dust collected in the dust receptacle 40 requires the relatively complicated steps of releasing a device for fixing the cyclone body 30 to the cleaner body 10, of separating the entire cyclone unit 20 from the cleaner body, of separating the dust receptacle from the cyclone body, of removing the contaminants from the dust receptacle, and of re-mounting the cyclone unit inside the cleaner body by reversing these steps.

The aim of the invention is to provide a device for detachably fixing a dust receptacle to a cyclone vacuum cleaner, which device enables the dust receptacle itself to be attached to, and detached from, the cyclone body fixed to the cleaner body, so that a user can empty contaminants collected in the dust receptacle with convenience.

Another aim of the invention is to provide a cyclone vacuum cleaner having a fixing device with a greatly improved convenience.

The present invention provides means for detachably fixing a dust receptacle to a cyclone vacuum cleaner, the cyclone vacuum cleaner comprising a cleaner body defining a mounting portion for receiving the dust receptacle and a cyclone unit having
 5 a cyclone body, the fixing means comprising a guide member, an operation lever and a groove formed in the dust receptacle, the groove having a predetermined depth and extending from substantially centre of that side of the dust receptacle that faces the bottom side of the mounting portion;

the guide member being disposed in the groove for guiding attachment and
 10 detachment of the dust receptacle, and comprising a cam follower having first and second receiving recesses having different heights;

the operation lever comprising a cam, a rotary shaft extending from the cam, and a manipulation part formed at the free end of the rotary shaft; and

a cam projection eccentrically positioned with respect of the centre of the cam and
 15 engageable with the cam follower;

wherein the operation lever is disposed in the cleaner body so as protrude outside the cleaner body, whereby rotation and counter-rotation of the operation lever moves the guide member upwards and downwards over a distance predetermined by the eccentricity of the cam projection.

20 As the operation lever is rotated and counter-rotated, the dust receptacle is moved upwards and downwards with respect to the cyclone body. As a result, the dust receptacle can be separated from the mounting portion of the cleaner body independently of the cyclone body, so that the collected contaminants can be removed.

25 The invention also provides a cyclone vacuum cleaner comprising:

a cleaner body having a vacuum generating device, and a nozzle unit at a lower portion of the cleaner body;

a cyclone body disposed in a mounting portion of the cleaner body for separating
 30 contaminants in air drawn in through an inflow passage which is in fluid communication with the nozzle unit, and for discharging clean air through an outflow passage which is in fluid communication with the vacuum generating device;

a dust receptacle detachably connected to the cyclone body for collecting the contaminants which are separated in the cyclone body; and

means for separately attaching the dust receptacle to, and detaching it from, the mounting portion, independently of the cyclone body,

5 wherein the fixing means comprises a guide member, an operation lever and a groove formed in the dust receptacle, the groove having a predetermined depth and extending from substantially the centre of that side of the dust receptacle that forms the bottom side of the mounting portion,

the guide member being disposed in the groove for guiding attachment and
10 detachment of the dust receptacle, and comprising a cam follower having first and second receiving recesses having different heights;

the operation lever comprising a cam, a rotary shaft extending from the cam, a manipulation part formed at the free end of the rotary shaft, and a cam projection
15 eccentrically positioned with respect to the centre of the cam and engageable with the cam follower;

wherein the operation lever is disposed in the cleaner body to protrude outside the cleaner body, whereby rotation and counter-rotation of the operation lever moves the guide member upwards and downwards over a distance predetermined by the
20 eccentricity of the cam.

The cyclone body may be mounted in the mounting portion in such a manner that a locking handle formed on a rear portion of the cyclone body is engageable with a
25 handle-coupling portion formed on inner wall of the mounting portion of the cleaner body.

Advantageously, the cleaner further comprises a handle provided at a front portion of the dust receptacle for a user to grip while handling the dust receptacle.

The invention will now be described in greater detail, by way of example, with
30 reference to the drawings, in which:

Figure 1 is a perspective view of a conventional cyclone vacuum cleaner with its cyclone unit detached;

Figure 2 is a front elevation of a cyclone vacuum cleaner having a fixing device constructed in accordance with the invention, and showing its cyclone unit detached;

Figure 3 is a perspective view showing the fixing device of Figure 2; and

Figures 4A and 4B are front views showing the cyclone unit of Figure 2, and
5 illustrating the operation of the fixing device.

Referring to the drawings, Figure 2 shows a cyclone vacuum cleaner having a cleaner body 100, a nozzle unit 200, and a cyclone unit 300. The cleaner body 100 is provided with a mounting portion 110 in which the cyclone unit 300 is detachably mounted. The
10 cleaner body 100 is also provided with a vacuum generating device (not shown). The nozzle unit 200 is disposed at a lower portion of the cleaner body 100.

The cyclone unit 300 comprises a cyclone body 310 and a dust receptacle 320. A locking handle 311 (see Figure 3) is disposed at a rear portion of the cyclone body 310,
15 the handle being fixable to a handle-coupling portion (not shown) disposed at an inner wall of the mounting portion 110 of the cleaner body 100 thereby to mount the cyclone body securely in the mounting portion. The dust receptacle 320 is removably attached at a bottom side of the cyclone body 310.

20 An inflow passage 312 is provided on an upper side of the cyclone body 310, the inflow passage being in fluid communication with the nozzle unit 200. Accordingly, contaminants on a surface to be cleaned are drawn in through the nozzle unit 200 and into the cyclone body 310 via the inflow passage 312. The inflow passage 312 is formed in such a manner that the air is drawn in to the cyclone body 310 in a tangential
25 direction. Consequently, the air drawn in via the inflow passage 312 is formed into a whirling current rotating along an inner side wall of the cyclone body 310.

An outflow passage 313 is provided at the centre of the upper side of the cyclone body 310, the outflow passage being in fluid communication with the vacuum generating
30 device. When the contaminants are removed from the air in the cyclone body 310, the air is discharged to the outside of the cleaner body 100 via the outflow passage 313 and

the vacuum generating device. The contaminants removed from the air in the cyclone body 310 are collected in the dust receptacle 320.

When the dust receptacle 320 is full, the user empties the collected contaminants by
5 detaching the dust receptacle 320 from the cleaner body 100. As described below, the dust receptacle 100 can be separately attached to, and detached from, the mounting portion 110 of the cleaner body 100, independently of the cyclone body 310.

The fixing device for separately attaching and detaching the dust receptacle 320 will
10 now be described. The bottom side of the dust receptacle 320 is provided with a groove 321 (see Figure 3) which extends from about the centre towards the rear portion of the dust receptacle, and has a predetermined depth and width. A handle 322 is provided on the front side of the dust receptacle 320, the handle being provided for gripping by the user when handling the dust receptacle.

15 A guide member 330 is disposed in the groove 321, for guiding the dust receptacle 320 during attachment and detachment. A cam follower 331 is provided on the bottom side of the guide member 330, the cam follower defining having first and second receiving recesses 331a, 331b, whose heights are different..

20 An operation lever 340 comprises a cam 341, a rotary shaft 342 extending from the cam, and a manipulation part 343 formed at one end of the rotary shaft. The operation lever 340 is disposed in the cleaner body 100 in such a manner that the manipulation part 343 is exposed, and protrudes to the outside of the cleaner body so that the
25 operation lever can rotate and counter-rotate. The cam 341 has a cam projection 341a which is eccentrically-positioned with respect to the centre of the cam and is inserted into the cam follower 331.

By way of example, as the operation lever 340 is rotated and counter-rotated by the user
30 through 90°, the guide member 330 is moved upwards and downwards in dependence upon the eccentricity of the cam projection 341a.

As the guide member 330 moves vertically, the dust receptacle 320 also moves upwards and downwards with respect to the cyclone body 310. Accordingly, the dust receptacle 320 can be separately detached, that is to say independently of the cyclone body 310. The operation of attaching and detaching the dust receptacle 320 is described below
5 with reference to Figures 3, 4A and 4B.

Figure 4A illustrates the operation lever 340 counter-rotated through 90°, which causes the cam projection 341a of the cam 341 to be positioned in the second receiving recess 331b of the cam follower 331 of the guide member 330. Accordingly, the guide
10 member 330 is pushed down by a predetermined amount. As the dust receptacle 320 is slidably connected to the cleaner body 100 by means of the guide member 330 and the groove 321, it also descends thereby to be separated from the cyclone body by a predetermined distance. In this case, the dust receptacle 320 by itself can be separated from the mounting portion 110 of the cleaner body 100 by holding and pulling forward
15 the handle 322.

In order to re-attach the dust receptacle 320 to the cyclone body 310 after removing the contaminants, the dust receptacle is firstly placed as shown in Figure 4A, and the operation lever 340 is then rotated, by way of example, through 90°. Accordingly, the
20 cam projection 341a of the cam 341 of the operation lever 340 is moved from the second receiving recess 331b to the first receiving recess 331a of the cam follower 331 of the guide member 330, and the guide member is lifted upwards by a predetermined distance. As a result, the dust receptacle 320 is also lifted upwards thereby to attach to the cyclone body 310 (see Figure 4B).

25 As described above, the dust receptacle 320 can be easily attached to, and detached from, the mounting portion 110 of the cleaner body 100, independently of the cyclone body 310 of the cyclone unit 300. Accordingly, the user can remove the contaminants collected in the dust receptacle 320 with more convenience. Therefore, when emptying
30 the contaminants collected in the dust receptacle 320, the user can separate just the dust receptacle 320, and then re-attach to the cyclone unit 300 with convenience.

That is to say, the convenience of using the cyclone vacuum cleaner described above is dramatically improved, thereby to provide satisfaction to the user and strengthen the competitiveness of the cleaner.

- 5 It will be understood by those of ordinary skill in the art that various changes in form and detail may be made to the cleaner described above.

Claims

1. Means for detachably fixing a dust receptacle to a cyclone vacuum cleaner, the cyclone vacuum cleaner comprising a cleaner body defining a mounting portion for receiving the dust receptacle and a cyclone unit having a cyclone body, the fixing means comprising a guide member, an operation lever and a groove formed in the dust receptacle, the groove having a predetermined depth and extending from substantially centre of that side of the dust receptacle that faces the bottom side of the mounting portion;
- 10 the guide member being disposed in the groove for guiding attachment and detachment of the dust receptacle, and comprising a cam follower having first and second receiving recesses having different heights;
- the operation lever comprising a cam, a rotary shaft extending from the cam, and a manipulation part formed at the free end of the rotary shaft; and
- 15 a cam projection eccentrically positioned with respect of the centre of the cam and engageable with the cam follower;
- wherein the operation lever is disposed in the cleaner body so as protrude outside the cleaner body, whereby rotation and counter-rotation of the operation lever moves the guide member upwards and downwards over a distance predetermined by the
- 20 eccentricity of the cam projection.
2. A cyclone vacuum cleaner comprising:
- a cleaner body having a vacuum generating device, and a nozzle unit at a lower portion of the cleaner body;
- 25 a cyclone body disposed in a mounting portion of the cleaner body for separating contaminants in air drawn in through an inflow passage which is in fluid communication with the nozzle unit, and for discharging clean air through an outflow passage which is in fluid communication with the vacuum generating device;
- a dust receptacle detachably connected to the cyclone body for collecting the
- 30 contaminants which are separated in the cyclone body; and
- means for separately attaching the dust receptacle to, and detaching it from, the mounting portion, independently of the cyclone body,

wherein the fixing means comprises a guide member, an operation lever and a groove formed in the dust receptacle, the groove having a predetermined depth and extending from substantially the centre of that side of the dust receptacle that forms the bottom side of the mounting portion,

5 the guide member being disposed in the groove for guiding attachment and detachment of the dust receptacle, and comprising a cam follower having first and second receiving recesses having different heights;

10 the operation lever comprising a cam, a rotary shaft extending from the cam, a manipulation part formed at the free end of the rotary shaft, and a cam projection eccentrically positioned with respect to the centre of the cam and engageable with the cam follower;

15 wherein the operation lever is disposed in the cleaner body to protrude outside the cleaner body, whereby rotation and counter-rotation of the operation lever moves the guide member upwards and downwards over a distance predetermined by the eccentricity of the cam.

3. A vacuum cleaner as claimed in claim 2, wherein the cyclone body is mounted in the mounting portion, and a locking handle formed on a rear portion of the cyclone body is engageable with a handle-coupling portion formed on an inner wall of the mounting portion of the cleaner body.

20

4. A vacuum cleaner as claimed in claim 2 or claim 3, further comprising a handle provided at a front portion of the dust receptacle for a user to grip while handling the dust receptacle.



Application No: GB 0325411.7
Claims searched: 1 to 4

Examiner: Richard Collins
Date of search: 26 April 2004

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	GB 2385515 A (SAMSUNG) see whole document.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^w:

A4F

Worldwide search of patent documents classified in the following areas of the IPC⁷:

A47L

The following online and other databases have been used in the preparation of this search report :

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